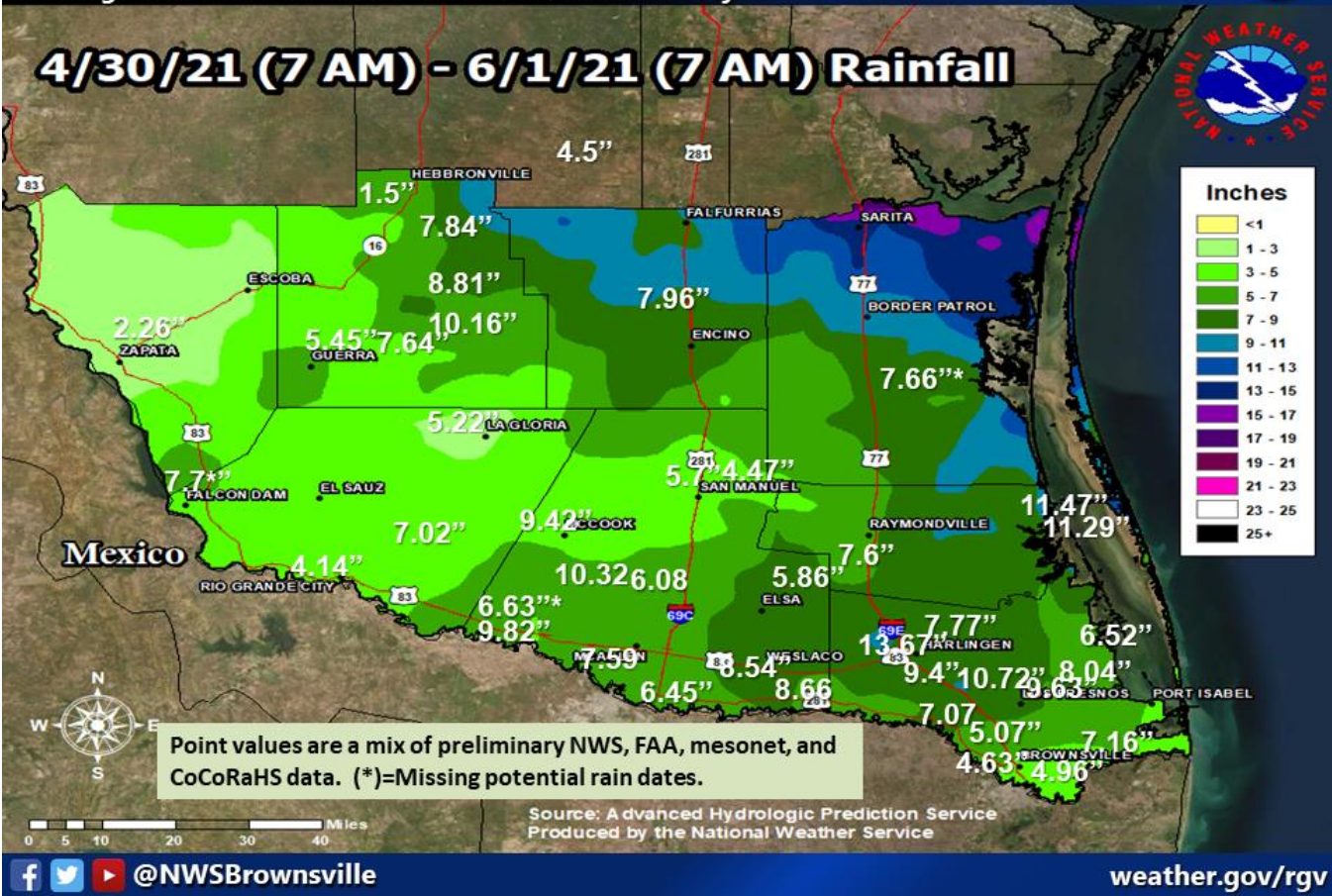


# May: Welcome Rainfall Ends/Erodes Drought

Weather Forecast Office  
Brownsville/RGV, TX



At Long Last, the Thunderstorms Came...Often...in May



## May 2021 “Flips the Script” Across the RGV After months of Building Drought, Torrential Rains Largely End It

From start to finish, periodic rain events in the form of thunderstorm clusters, lines, or systems, poked holes into the Severe to Exceptional Drought that had developed over the course of dry to very dry conditions since October 2020. The rain, combined with typically warmer and more humid conditions that come with the advance of spring, also took care of “freeze-cured” wildlands as green-up returned in force. The monthly rain totals (above, including very early morning rains on June 1<sup>st</sup> across the upper Valley/Rio Grande Plains) ranked among the top ten wettest on record, including the following locations (May only):

- Port Mansfield: Wettest. 11.47 inches. Prior record: 8.6 inches (1991). Records since 1958.
- Santa Rosa: Wettest, 8.9 inches. Prior record: 8.25 inches (2007). Records since 1987.
- McAllen/Miller: #2 wettest, 7.59 inches. Record: 7.91 inches (1966). Records since 1962.
- McAllen/Water Plant: #3 wettest, 7.42 inches. Record: 8.67 inches (1992). Records since 1942.
- Falcon Dam: #3 wettest. 7.7 inches. Prior Record, 8.26 inches (1982). Records since 1963.
- McCook: #3 wettest, 8.55 inches. Record: 9.24 inches (1982). Records since 1942\*
- Mission/La Joya: #5 wettest, 6.63 inches. Record: 7.75 inches (1981). Records since 1911\*
- Raymondville: #7 wettest, 8.07 inches. Record: 14.17 inches (1924). Records since 1911.

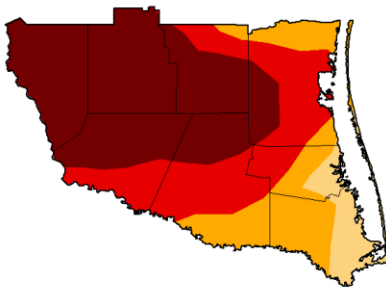
\*Missing several years (gaps) in the data.

Individual events that contributed to the top ten rainfall totals at the above sites occurred during the pre-dawn hours of May 1, May 11-12, May 15-16, May 18-19, and May 29. Another round of torrential rains fell as the calendar turned to June (pre-dawn), a fitting bookend to the month which started the turn from brown to green.

# Drought, Out!

Drought had built to Severe to Exceptional levels across the region, with Extreme to Exceptional levels across roughly three-quarters of the Deep South Texas/Rio Grande Valley region by the end of April (below, left). Water levels at Falcon International Reservoir had plummeted to 14 percent total share, and 20 percent Texas share – among the lowest of the century. Due to the drought and the low water levels at Falcon and Amistad (near Del Rio), the Laguna Madre Water District instituted conservation efforts to get ahead of what was forecast to be a continued dry and hot late spring and summer. With each passing week of rain events, however, the drought levels were chipped away. By the start of June, Extreme to Exceptional Drought was extinguished and Severe Drought remained in a sliver of Zapata County (for 3 percent of the entire region). Areas with **no** drought rose from zero percent to more than 53 percent! The maps below tell the tail.

## U.S. Drought Monitor Brownsville/Rio Grande Valley, TX WFO



**April 27, 2021**  
(Released Thursday, Apr. 29, 2021)  
Valid 8 a.m. EDT

	None	Drought Conditions (Percent Area)				
		D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	93.34	75.92	49.92
Last Week (4-20-2021)	0.00	100.00	100.00	93.34	75.92	36.21
3 Months Ago (1-28-2021)	0.00	100.00	95.38	74.70	34.02	0.00
Start of Calendar Year (12-28-2020)	0.00	100.00	100.00	73.94	17.05	0.00
Start of Water Year (9-29-2020)	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago (4-28-2020)	0.00	100.00	99.99	67.25	11.33	0.00

**Intensity**  
 None D0 Abnormally Dry D1 Moderate Drought D2 Severe Drought D3 Extreme Drought D4 Exceptional Drought

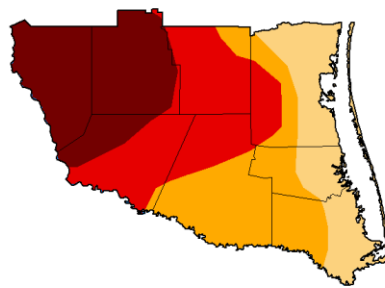
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:  
Richard Heim  
NCEI/NOAA



[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

## U.S. Drought Monitor Brownsville, TX WFO



**May 4, 2021**  
(Released Thursday, May 6, 2021)  
Valid 8 a.m. EDT

	None	Drought Conditions (Percent Area)				
		D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	81.34	56.13	28.18
Last Week (4-27-2021)	0.00	100.00	100.00	92.75	75.29	49.38
3 Months Ago (1-28-2021)	0.00	100.00	94.80	73.95	33.68	0.00
Start of Calendar Year (12-28-2020)	0.00	100.00	100.00	73.21	16.91	0.00
Start of Water Year (9-29-2020)	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago (5-05-2020)	0.00	100.00	100.00	67.68	19.91	0.00

**Intensity**  
 None D0 Abnormally Dry D1 Moderate Drought D2 Severe Drought D3 Extreme Drought D4 Exceptional Drought

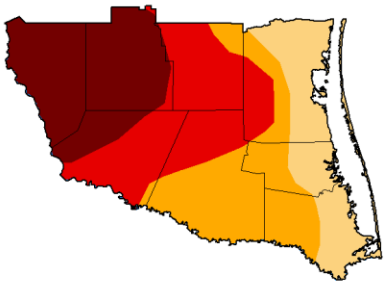
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:  
David Simeral  
Western Regional Climate Center



[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

## U.S. Drought Monitor Brownsville, TX WFO



**May 11, 2021**  
(Released Thursday, May 13, 2021)  
Valid 8 a.m. EDT

	None	Drought Conditions (Percent Area)				
		D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	81.34	56.13	28.18
Last Week (5-04-2021)	0.00	100.00	100.00	81.34	56.13	28.18
3 Months Ago (2-09-2021)	0.00	100.00	99.40	78.83	44.43	0.00
Start of Calendar Year (12-28-2020)	0.00	100.00	100.00	73.21	16.91	0.00
Start of Water Year (9-29-2020)	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago (5-12-2020)	0.00	100.00	84.43	34.16	10.66	0.00

**Intensity**  
 None D0 Abnormally Dry D1 Moderate Drought D2 Severe Drought D3 Extreme Drought D4 Exceptional Drought

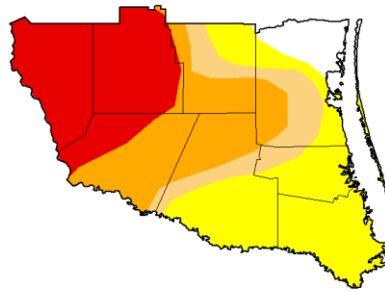
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Author:  
David Simeral  
Western Regional Climate Center



[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

## U.S. Drought Monitor Brownsville/Rio Grande Valley, TX WFO



**May 18, 2021**  
(Released Thursday, May 20, 2021)  
Valid 8 a.m. EDT

	None	Drought Conditions (Percent Area)				
		D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	4.80	95.20	63.40	51.86	28.54	0.00
Last Week (5-11-2021)	0.00	100.00	100.00	82.15	56.71	28.49
3 Months Ago (2-18-2021)	0.00	100.00	99.49	79.63	44.87	0.00
Start of Calendar Year (12-28-2020)	0.00	100.00	100.00	73.94	17.05	0.00
Start of Water Year (9-29-2020)	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago (5-18-2020)	15.58	84.42	45.92	13.31	0.00	0.00

**Intensity**  
 None D0 Abnormally Dry D1 Moderate Drought D2 Severe Drought D3 Extreme Drought D4 Exceptional Drought

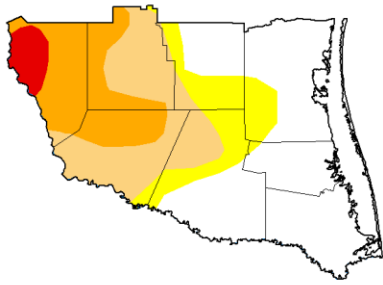
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:  
Adam Hartman  
NOAA/NWS/NCEP/CPCC



[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

**U.S. Drought Monitor  
Brownsville/Rio  
Grande Valley, TX WFO**



**May 25, 2021**  
(Released Thursday, May 27, 2021)  
Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	44.64	55.36	42.51	21.27	3.38	0.00
Last Week	4.80	95.20	63.40	51.85	28.54	0.00
3 Months Ago	0.00	100.00	99.70	87.42	58.25	0.00
Start of Calendar Year	0.00	100.00	100.00	73.94	17.05	0.00
Start of Water Year	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago	58.81	41.19	13.49	1.82	0.00	0.00

**Intensity:**  
 None (White)      D0 Abnormally Dry (Yellow)      D1 Moderate Drought (Light Orange)      D2 Severe Drought (Orange)      D3 Extreme Drought (Red)      D4 Exceptional Drought (Dark Red)

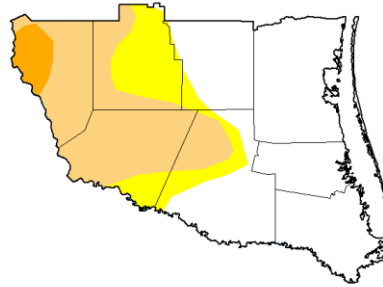
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**Author:**  
Adam Hartman  
NOAA/NWS/NCEP/CPC



[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

**U.S. Drought Monitor  
Brownsville/Rio  
Grande Valley, TX WFO**



**June 1, 2021**  
(Released Thursday, Jun. 3, 2021)  
Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	53.75	46.25	32.21	3.26	0.00	0.00
Last Week	44.64	55.36	42.51	21.27	3.38	0.00
3 Months Ago	0.00	100.00	100.00	88.21	65.76	0.00
Start of Calendar Year	0.00	100.00	100.00	73.94	17.05	0.00
Start of Water Year	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago	88.50	13.50	1.88	0.00	0.00	0.00

**Intensity:**  
 None (White)      D0 Abnormally Dry (Yellow)      D1 Moderate Drought (Light Orange)      D2 Severe Drought (Orange)      D3 Extreme Drought (Red)      D4 Exceptional Drought (Dark Red)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

**Author:**  
Brian Fuchs  
National Drought Mitigation Center



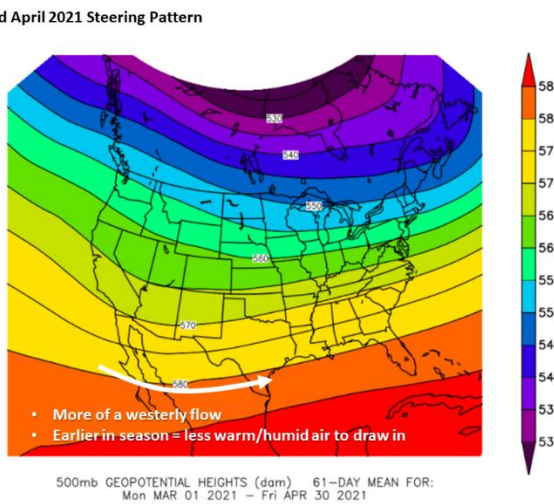
[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

**Pattern Matters**

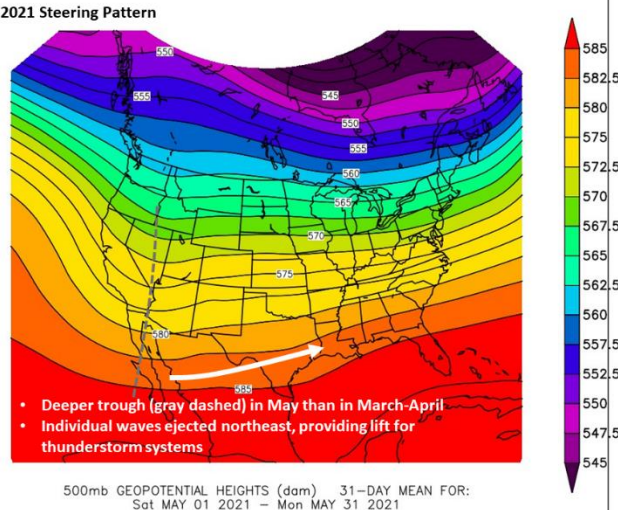
The reason for the “flipped script” was a changed steering pattern, that for so long had favored **westerly**, rather than **southwesterly**, mid level flow through the first two months of boreal spring (below, left). For May, a persistent trough was located across the southwest U.S. and northwest Mexico; a series of energy waves spun out of this trough and crossed into west Texas, providing the lift to the increasingly moist/unstable near surface air mass across south Texas and the Sierra Madre. Clusters/lines/ “systems” of thunderstorms would organize west or northwest of the Rio Grande Plains/Rio Grande Valley, then make their move across all or portions of the Rio Grande Valley/Deep South Texas region spaced about a week to ten days apart. Several of these drove cooler surface air into the region (as cold fronts); for example, temperatures on May 12<sup>th</sup> remained in the 60s and 70s (some 10 to 20 degrees below average) after the overnight event; a similar event that slogged through the region on May 19<sup>th</sup> kept temperatures in the 60s (20 to 25 degrees below average) for the populated Rio Grande Valley, born on hours of northwest winds that brought cooler air to the surface from the core of the thunderstorms themselves.

The frequent rain events tilted the monthly average temperature into the below average camp, ranging from 1.5 to 3 degrees below average [Note that “average” is now defined as based on the [warmer 1991-2020 values](#). The averages still ranked in the top third warmest (46<sup>th</sup> all time) at Brownsville, but among the cooler averages (33<sup>rd</sup> lowest) in McAllen, where more rain and cooler temperatures were noted.

March and April 2021 Steering Pattern

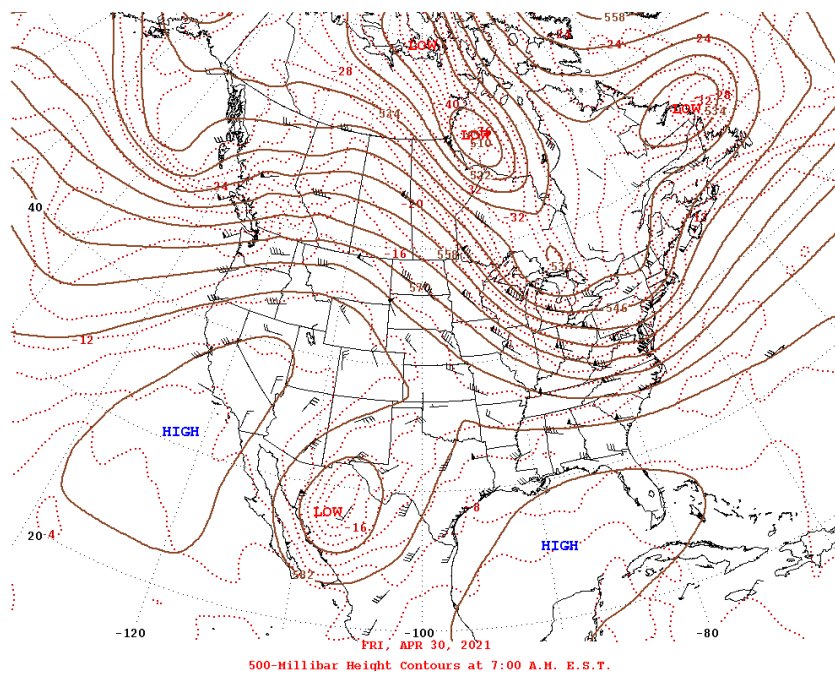
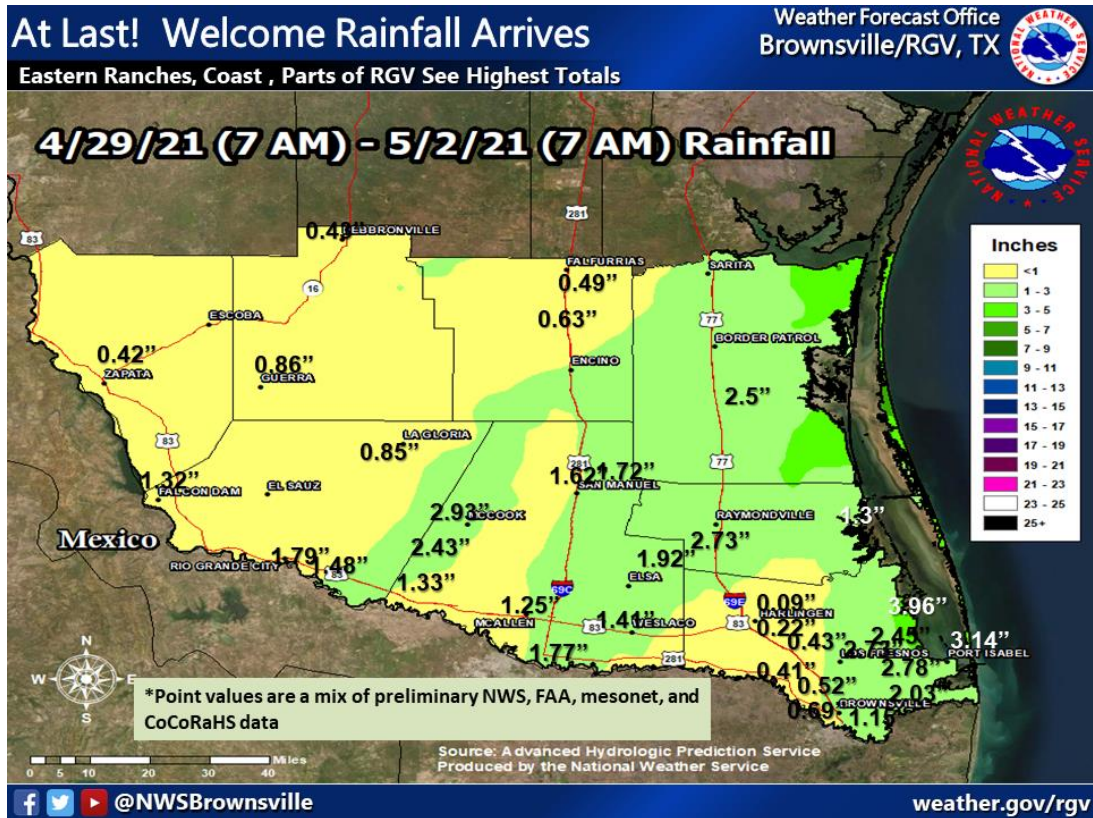


May 2021 Steering Pattern



## Individual Events: A Quick Review

**April 30-May 1:** The first of many energy “waves” ejected from an upper level trough (“Low”) centered over Chihuahua State, Mexico, and provided the first widespread heavy rainfall event to all of coastal and a portion of inland south Texas. For portions of the mid/upper Valley (Hidalgo and Starr), the rainfall was the first significant (i.e. 1 to 2+ inches) amount of the year, and began the slow improvement from Extreme to Exceptional Drought to Severe to Extreme Drought by May 4<sup>th</sup>. Impacts were limited to ponding of water and some nuisance minor poor drainage flooding, mainly in Hidalgo and Willacy County.



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**May 11-12:** The season's first complex squall line event formed along the Sierra Madre then stretched into the South Texas Brush Country by mid evening on the 11<sup>th</sup>, then accelerated through all of Deep South Texas, reaching the Jim Hogg/Brooks County ranch country by late evening on the 11<sup>th</sup>. The line contained several bow-shaped segments, the first into Jim Hogg and Brooks County between 9 and 1030 PM on the 11<sup>th</sup>. A severe cell, containing wind gusts to 70 mph and small hail, developed along the Rio Grande toward central Zapata County at around the same time (just before 10 PM CDT, with damage between 10 and 1005 PM on the 11<sup>th</sup>). This cell would set off additional development along the south end of the Jim Hogg storms, as well as into northwest Tamaulipas, Mexico. This area became dominant around midnight, and rolled through southern Starr, most of Hidalgo, and Cameron County between midnight and 3 AM, exiting the Rio Grande east of Brownsville around 330 AM on May 12<sup>th</sup>. A full radar loop of the line can be found [here](#). Damaging wind of 65 to 70 mph occurred in/near the Weslaco/Donna area between 111 and 120 AM on the 12<sup>th</sup> (see radar image below). Hundreds of small to large tree limbs were blown down across the Valley, favoring the Roma/Rio Grande City area, Pharr through Weslaco, and a few pockets of central and western Cameron County.

Additional rainfall of 2 to 3 inches, locally 4 inches, fell along and just north of the Rio Grande from southern Zapata through Cameron County, creating numerous short-duration instances of nuisance urban/poor drainage flooding, which fortunately occurred during the lightest daily traffic time. By daybreak, most of the minor flooding had receded with mainly drainage ditches containing high water where heaviest rains fell.

Survey results in text form are shown below. To view individual survey points, click [here](#), then zoom into the south Texas region. In the upper right, select "Begin Date" as 5/11/2021 and "End Date" as 5/13/2021. At this point, you'll see a series of colored dots along the Rio Grande; zoom in further to see the street location, then click on each for the details of each point, including multiple photos of damage.

PUBLIC INFORMATION STATEMENT

NATIONAL WEATHER SERVICE BROWNSVILLE TX

909 PM CDT Wed May 12 2021

...NWS DAMAGE SURVEY FOR 05/12/21 THUNDERSTORM WIND EVENT IN  
SOUTHERN HIDALGO COUNTY...

.OVERVIEW...SEVERE THUNDERSTORMS DEVELOPED ALONG A SQUALL LINE  
THAT ACCOMPANIED A LATE SEASON COLD FRONT ACROSS THE RIO GRANDE  
VALLEY JUST AFTER MIDNIGHT ON MAY 12. WIDESPREAD WIND IMPACTS  
OCCURRED ALONG THE INTERSTATE HIGHWAY 2 CORRIDOR BETWEEN MCALLEN  
AND MERCEDES...WITH THE MOST SIGNIFICANT DAMAGE BETWEEN DONNA  
AND WESLACO.

.DONNA TO WESLACO THUNDERSTORM WIND...

PEAK WIND /E/: 65-70 MPH

PATH LENGTH /STATUTE/: 6.25 MILES

PATH WIDTH /MAXIMUM/: 2.83 MILES

FATALITIES: NONE

INJURIES: NONE

START DATE: MAY 12 2021

START TIME: 111 AM CDT

START LOCATION: 1.5 MILES W DONNA / HIDALGO / TX

START LAT/LON: 26.18 /-98.06

END DATE: MAY 12 2021

END TIME: 120 AM CDT

END LOCATION: 1.9 MILES E WESLACO / HIDALGO / TX

END LAT/LON: 26.17 / -97.96

SURVEY SUMMARY: At least a half dozen manufactured homes sustained damage, mainly from peeled-back or blown off tin roofs, and car ports knocked down, in portions of Donna and Weslaco along and near the Interstate 2 corridor. One home slid off its foundation midway between the cities. Several mesquite and ash trees were uprooted, split, or lost large limbs. One uprooted large tree damaged a car in Donna. Several parts of fences were blown down, and unanchored road signs were also blown down.

NOTE:

THE INFORMATION IN THIS STATEMENT IS PRELIMINARY AND SUBJECT TO CHANGE PENDING FINAL REVIEW OF THE EVENT AND PUBLICATION IN NWS STORM DATA.

PUBLIC INFORMATION STATEMENT

NATIONAL WEATHER SERVICE BROWNSVILLE TX

708 PM CDT Wed May 12 2021

...NWS DAMAGE SURVEY FOR 05/11/21 THUNDERSTORM WIND EVENT...

Overview. Thunderstorms preceding a cold front.

.ZAPATA THUNDERSTORM WIND...

PEAK WIND /E/: 70 MPH

PATH LENGTH /STATUTE/: 1.54 MILES

PATH WIDTH /MAXIMUM/: 1.08 MILES

FATALITIES: NONE

INJURIES: NONE

START DATE: MAY 11 2021

START TIME: 10:00 PM CDT

START LOCATION: 1 MILE S ZAPATA / ZAPATA / TEXAS

START LAT/LON: 26.87 / -99.26

END DATE: MAY 11 2021

END TIME: 10:05 PM CDT

END LOCATION: 2 MILES S ZAPATA / ZAPATA / TEXAS

END LAT/LON: 26.85 / -99.25

SURVEY SUMMARY:

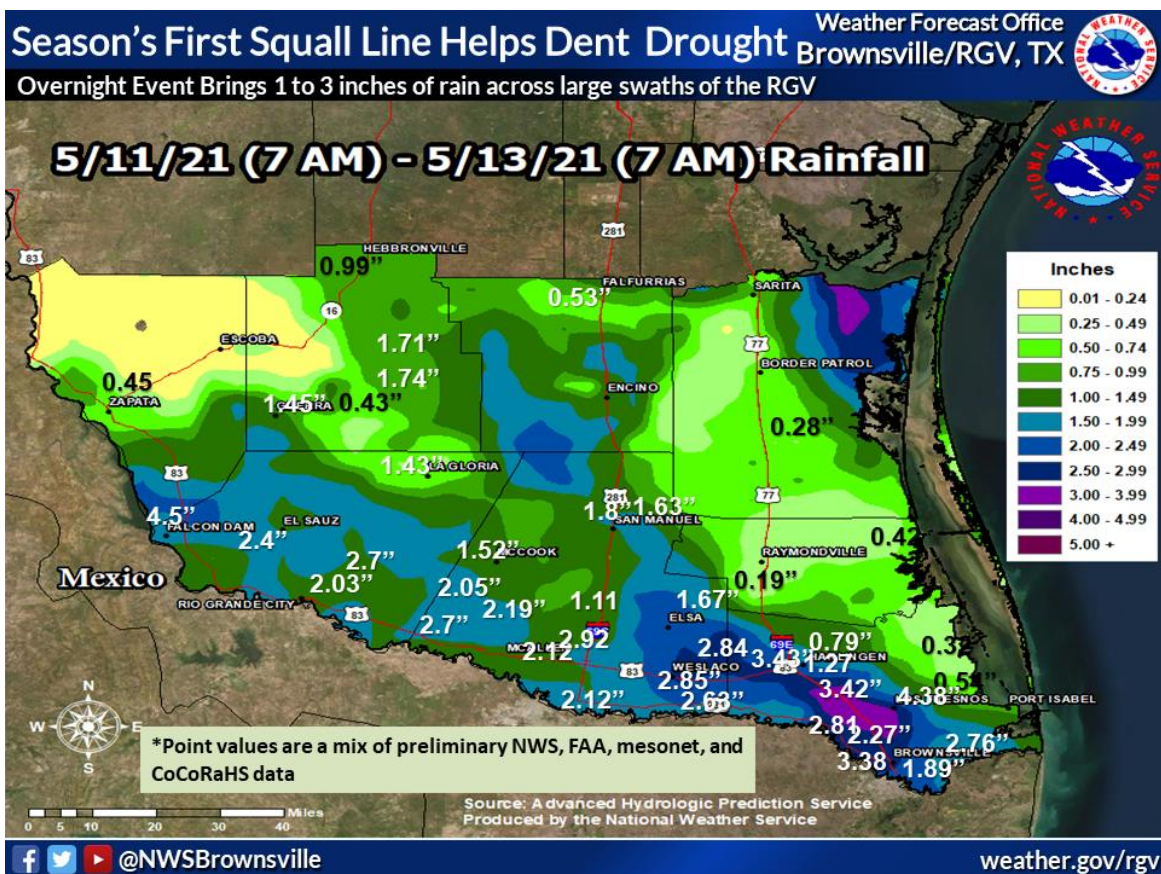
More than two dozen structures sustained varying damage to poorly constructed wood, asphalt, and aluminum/tin roofs, roof decking, and shingles in the Siesta Shores and Falcon Heights neighborhoods in south Zapata, Texas. A poorly seated cinder block knee wall and attached fence was blown down, and a 100-foot tall thin metal tower was twisted. A few power poles were knocked down by flying aluminum roof pieces. Dozens of medium mesquite limbs were blown down by flying aluminum roof pieces.

NOTE:

THE INFORMATION IN THIS STATEMENT IS PRELIMINARY AND SUBJECT TO CHANGE PENDING FINAL REVIEW OF THE EVENT AND PUBLICATION IN NWS STORM DATA.

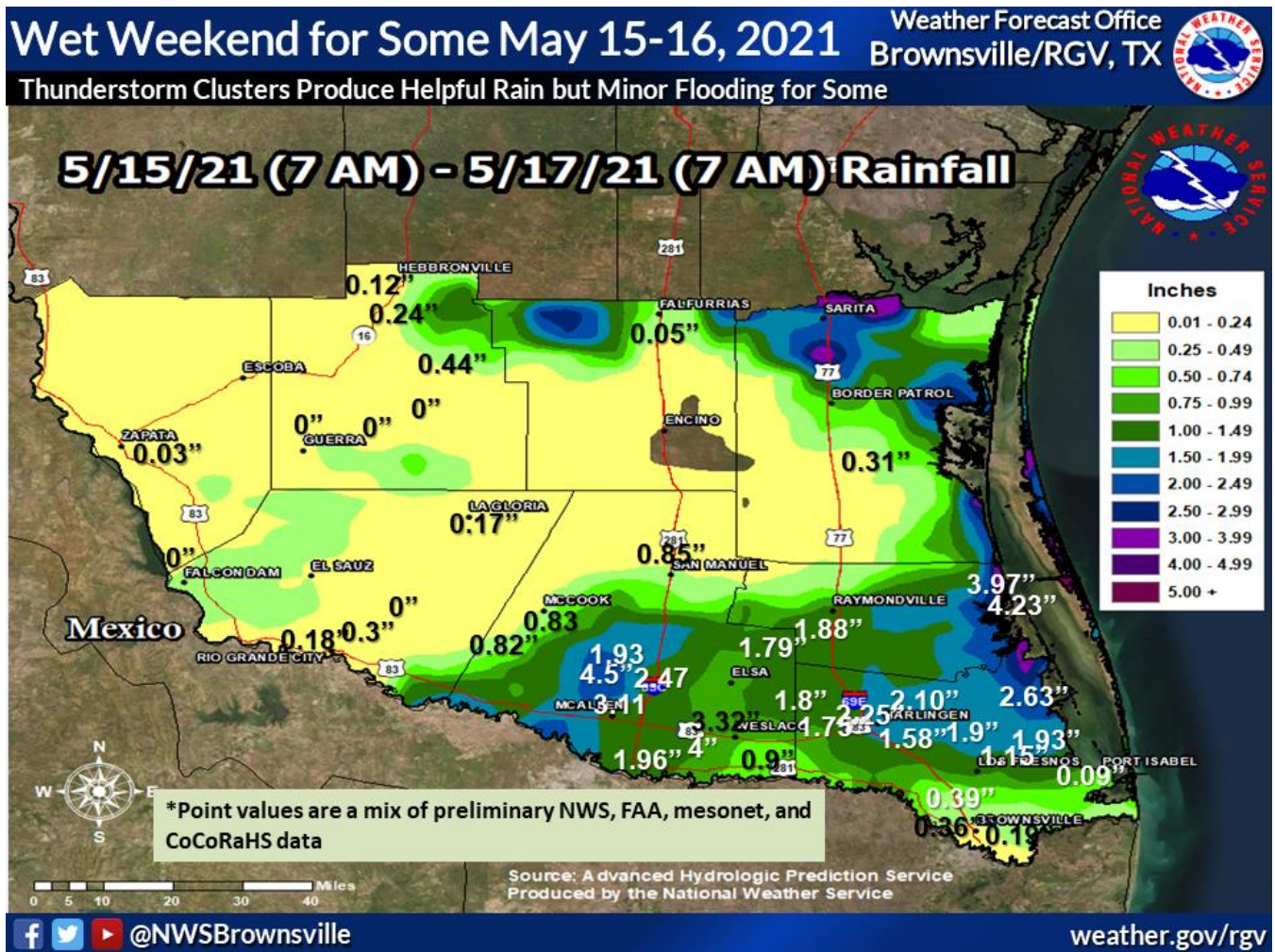


Above: Screenshot of base velocity (0.5° elevation) at 125 AM May 12<sup>th</sup>, showing classic downburst signature over Weslaco. Bright blue colors suggest 65 to 70 mph wind speeds, a few thousand feet above the surface. Moments earlier, these winds produce damage to carports and roofs in mobile home communities along and south of Interstate 2 between Donna and Weslaco.





**May 15-16:** A much weaker upper level disturbance helped induce a cluster of midday thunderstorms that produced locally heavy rainfall across the mid and lower Rio Grande Valley on May 15<sup>th</sup>, along with additional nuisance flooding of poor drainage areas. Boundaries from these storms, as well as boundaries from stronger cells that moved south out of the Coastal Bend early on May 16<sup>th</sup>, spawned slow moving but very heavy rain producing cells along Padre Island National Seashore (PINS) extending west to Port Mansfield. An additional 3.4 inches fell in Port Mansfield; radar estimated 6+ inches of rain along PINS and into the nearshore Gulf waters along the Kenedy County coast. The combined rainfall of May 11-12 and 15-16 further eroded drought in the Valley, with the populated sections improved to Abnormal Dryness and Moderate Drought, the lowest values on the [5-category scale](#), which ranges from [Drought 0 \(Dryness\)](#) to [Drought 4 \(Exceptional\)](#).



# Monthly Rainfall Piles Up, May 2021

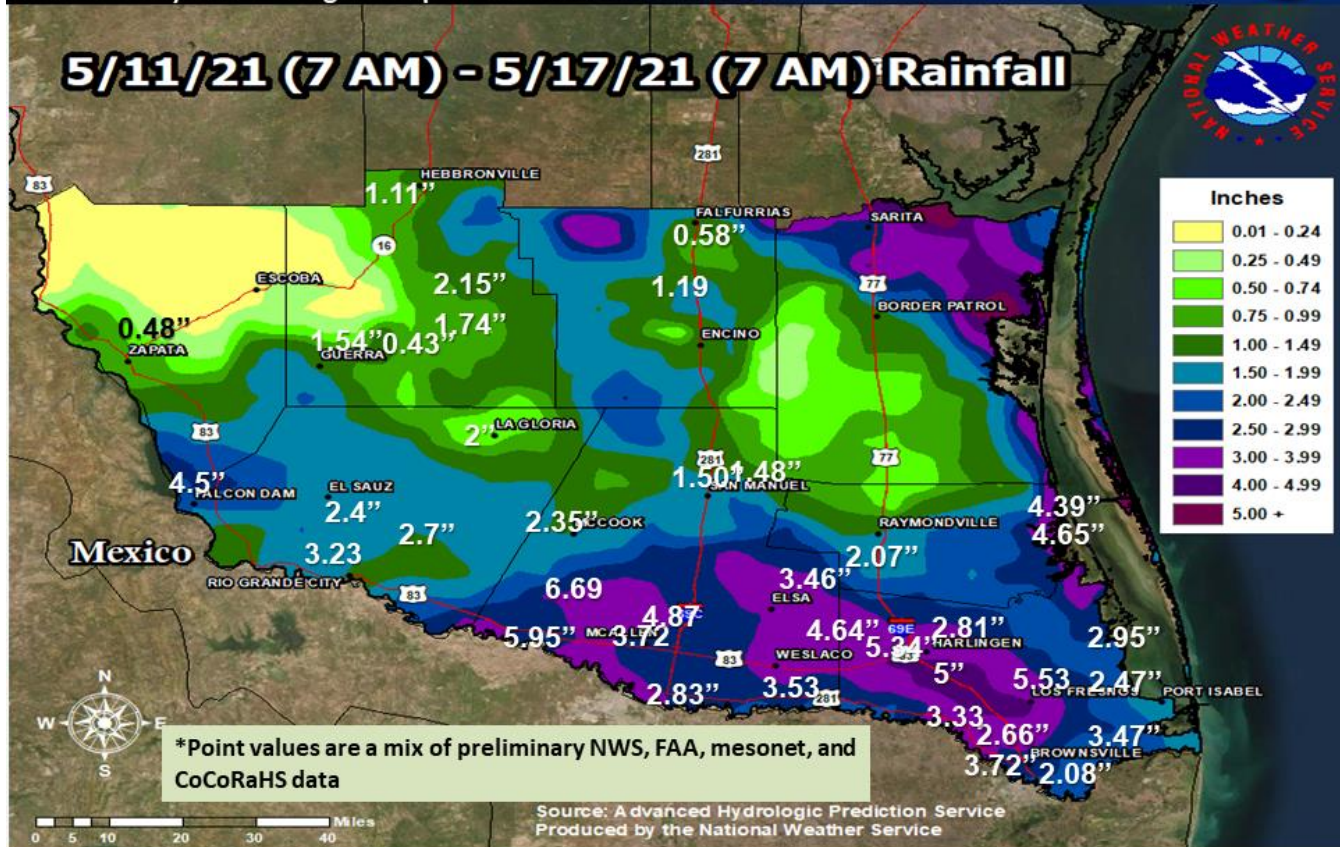
Weather Forecast Office  
Brownsville/RGV, TX



Week of May 11-17 Brings Multiple Thunderstorm Clusters



## 5/11/21 (7 AM) - 5/17/21 (7 AM) Rainfall



@NWSBrownsville

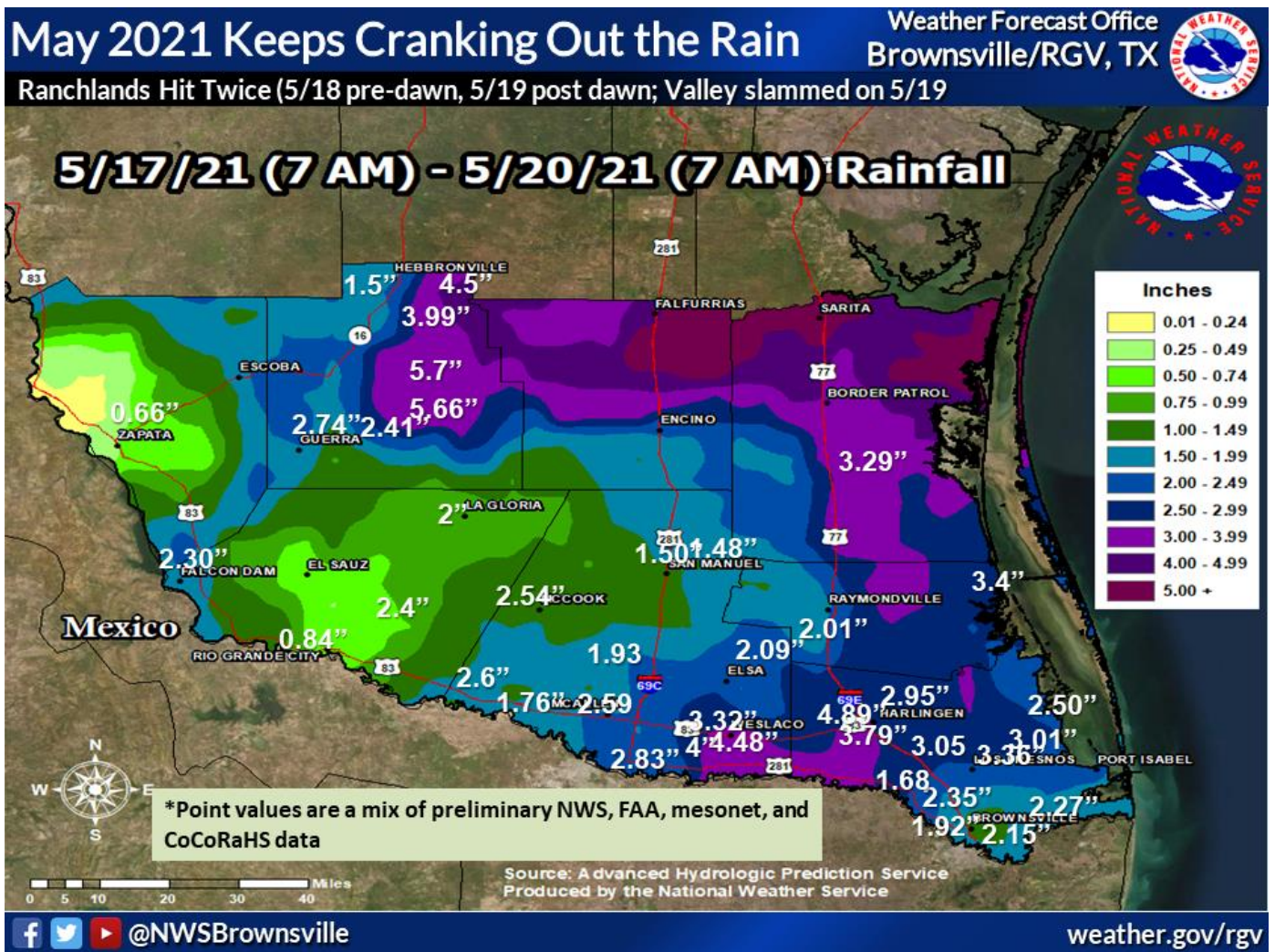
weather.gov/rgv

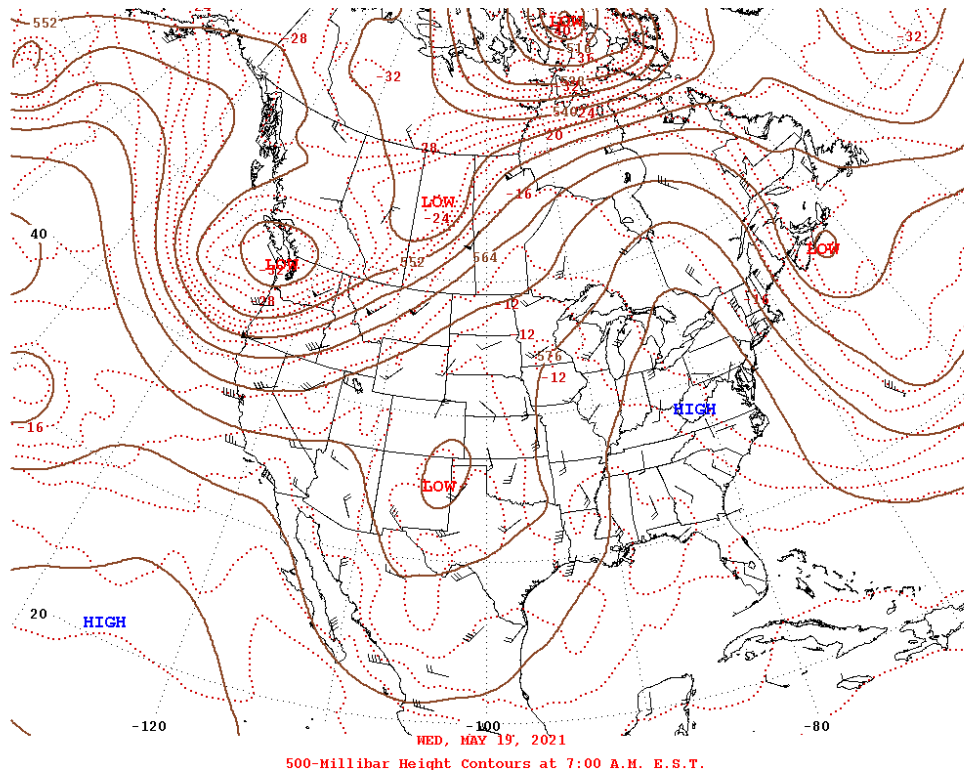
**May 18-19:** Two events occurred which continued moisture's march on drought removal. Early on May 18<sup>th</sup>, a mini squall-line ripped across the South Texas Brush Country and King Ranch region, dropping 1 to more than 3 inches from eastern Jim Hogg County through northern Kenedy County. A second thunderstorm system (squall line with multiple segments) moved across Deep South Texas from northwest to southeast through the day, darkening skies and dropping torrential rainfall with rates of 2 or more inches per hour in some spots. This time, poor drainage locations that were now relatively saturated from events of May 11-12 and May 15-16 filled up and flooded a few neighborhoods and frontage roads with several feet of water. These locations included Weslaco/Donna, McAllen, and Los Fresnos. Some frontage roads along Interstate Highway 2 in eastern Hidalgo County were closed for a day or more until the water could drain out.

Each event was generally spawned by more individual "energy waves" rotating around another deeper southwest U.S. upper level low, each causing sufficient lift to activate a moist air mass. The strength of the squall allowed cool mid-level air to surge to the surface following the gust front; temperatures in the rain and the low clouds that followed held in the mid to upper 60s for hours, some 20 to 25 degrees below afternoon averages for the date. Drier air that followed that night brought morning temperatures down to the refreshing upper 50s to lower 60s, and set the stage for a period of rain-free weather that would last a little more than a week.

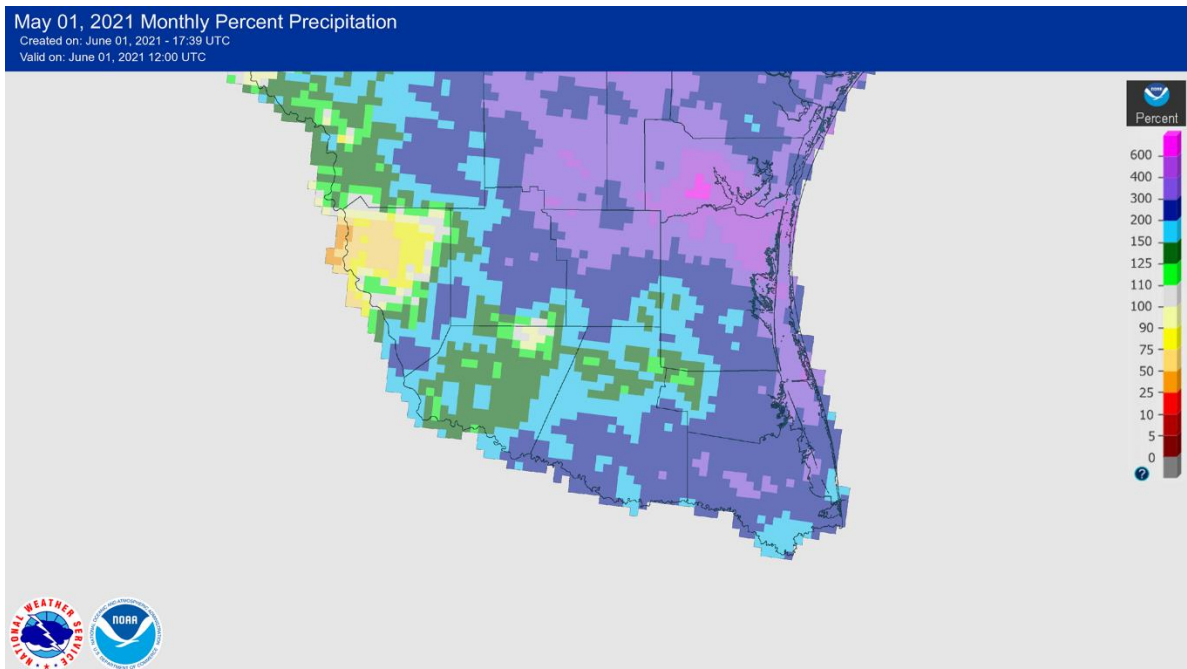


Above: Flooding in Weslaco during the mid to late morning of May 19<sup>th</sup>, 2021. Photos courtesy of Weslaco Emergency Management.





**May 29-June 1 pre-dawn:** A final wave of energy rode down the back side of a weak trough in east Texas early on May 29<sup>th</sup>, spawning a southeast-moving broken line of thunderstorms that dropped 1 to 2 inches from the Brush Country southeast into the King Ranch and lower Valley (Willacy and Cameron) through the morning into the early afternoon. While impacts were minimal, mainly high standing water in ditches, the additional rainfall was a fitting end to the much above average month. And it wasn't quite over; another cluster of thunderstorms dropped significant post-midnight rainfall after the calendar changed to June across Starr, Jim Hogg, and part of Zapata County. All told, monthly departures from average were two to three times above in a crescent from the Brush Country through the King Ranch, then southward/westward to include most of the populated Rio Grande Valley (below).



**Early June Keeps It Going**

Rainfall associated with more energy waves rotating around the continued southwest U.S. trough built a surplus of moisture into the agricultural-rich areas of the Rio Grande Valley as well as livestock ranch country north of the region. Seven day totals for the first full week of June were 4 to 6 times average in these areas; one example of this was the City of McAllen, which recorded 7.14 inches in three days. This record shattered prior June 1-3 values by nearly five inches, but more notably, ranked 5<sup>th</sup> wettest **for the month of June** and was the 15<sup>th</sup> highest ranked three consecutive day periods at any time, with rival events mainly from tropical cyclones (Inez, Alex, Beulah, Hanna, to name a few). Look for more information on June in a monthly summary in early July, as additional rains may be coming following a dry spell that began on June 5<sup>th</sup>.

